



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,361	12/22/2003	Shin Hwa Li	98-P-009D1 (850063.529D1)	7964
30423	7590	04/23/2004	EXAMINER	
STMICROELECTRONICS, INC. MAIL STATION 2346 1310 ELECTRONICS DRIVE CARROLLTON, TX 75006			GHYKA, ALEXANDER G	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 04/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/743,361

Applicant(s)

LI ET AL.

Examiner

Alexander G. Ghyka

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

ALEXANDER GHYKA
PRIMARY EXAMINER

AV 2812
[Signature]

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Ngo et al (US 6,127,261).

Ngo et al teach a method of forming interlayer dielectric layers including a substrate (102); a patterned oxide layer (104) disposed over the substrate (102); a layer of undoped silicate glass (112) disposed over the patterned oxide layer (104); a layer of borophosphorous silicate glass (106) over the layer of undoped silicate glass (112); and a planarized layer of plasma enhanced tetraethyl orthosilicate (110) over at least a portion of the borophosphorus silicate glass layer (106), the layers of the undoped silicate glass layer (112), the borophosphorus silicate glass layer (106) and the planarized plasma enhanced tetraethyl orthosilicate layer (110) together forming a pre-metal dielectric layer (column 1, line 29-column 5, line 15), as required by Claim 1. See column 1, line 29 to column 5, line 15. Moreover, Ngo et al disclose a CMP process as required in Claim 2. See column 3, lines 40-50. Furthermore, Ngo et al teach that the trilayer dielectric is 13700 Angstroms which anticipates Claim 6 which requires less than 15000 Angstroms. See column 3, lines 1-5. Therefore, Claims 1- 2 and 6 are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4-5 rejected under 35 U.S.C. 103(a) as being unpatentable over Ngo et al (US 6,127,261).

Ngo et al is relied upon as discussed above. Ngo et al disclose that the TEOS layer has a thickness of 10200 Angstroms and the trilayer dielectric has a thickness of approximately 13700 Angstroms. See column 3, lines 1-10.

However, Ngo et al fail to teach the thicknesses of the USG and BPSG layers.

It would have been obvious for one of ordinary skill in the art to arrive at the presently claimed invention as the selection of the thicknesses in light of the parameters

Art Unit: 2812

disclosed by Ngo et al is simply a matter of determining an optimum process condition by routine experimentation. See *In re Jones*, 162 USPQ 224 (CCPA 1955). Moreover, the discovery of an optimum value of a result effective variable in a known process is obvious. See *In re Boesch*, 205 USPQ 215 (CCPA 1980). Furthermore, as the cited prior art discloses overlapping ranges, a *prima facie* case of obviousness is established. See *In re Wertheim*.

Claims 3 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ngo et al as applied to claims 1-2 and 4-6 above, and further in view of Dawson (US 5,503,882).

Ngo et al is relied upon as discussed above.

However, Ngo et al fail to teach forming a second layer of plasma enhanced tetraethyl orthosilicate overlying the planarized layer of plasma enhanced tetraethyl orthosilicate layer, directly overlying and being in contact with at least a portion of the borophosphorous silicate glass region having a planar surface.

Dawson (Figure 7 B) in a related method for planarizing integrated circuit topography teaches the steps of forming a planarized layer of plasma enhanced tetraethyl orthosilicate (42); and a capping layer comprising a second layer of plasma enhanced tetraethyl orthosilicate (52) overlying the planarized layer of plasma enhanced tetraethyl orthosilicate layer (42). Dawson also discloses that the capping layer provides a barrier against water sorption into layers below the capping layer. See column 9, lines 4-20.

Art Unit: 2812

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form the capping layer of Dawson onto the interlayer dielectric structure of Ngo et al and extend the capping in contact with the BPSG, for the benefit of providing a barrier against water sorption into the layers below the capping layer as disclosed by the Dawson reference. With respect to the thicknesses of the layers al this is simply a matter of determining an optimum process condition by routine experimentation. See *In re Jones*, 162 USPQ 224 (CCPA 1955). Moreover, the discovery of an optimum value of a result effective variable in a known process is obvious. See *In re Boesch*, 205 USPQ 215 (CCPA 1980). Furthermore, as the cited prior art discloses overlapping ranges, a *prima facie* case of obviousness is established. See *In re Wertheim*.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander G. Ghyka whose telephone number is (571) 272-1669. The examiner can normally be reached on Monday through Thursday during general business hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John F Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

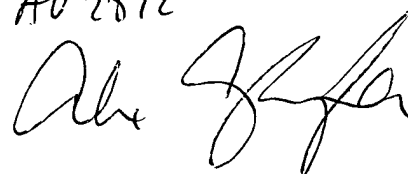
Art Unit: 2812

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AGG
April 18, 2004

ALEXANDER GHYKA
PRIMARY EXAMINER

AV 2812

A handwritten signature in cursive script, appearing to read 'Alex Ghyska', written in black ink.